Space Crop Production

As astronauts venture farther from Earth, and for longer periods, food will become increasingly critical. Crop production can supplement a packaged diet to provide additional nutrients and variety for astronauts. Testing with the Veggie and Advanced Plant Habitat chambers on the International Space Station is allowing us to understand the impacts of gravity and spaceflight on crop growth and nutritional content, and the importance of plants to astronauts living and working away from our home planet. The space environment presents unique challenges to crop production, and technology and knowledge gaps have been identified. Key gaps include how to:

- Identify and demonstrate effective options to provide both water and oxygen to the root zone in microgravity
- Understand the deep space radiation impacts on seeds and plants
- Investigate the relationship between microbiomes and food safety
- Store and handle seeds to ensure they are viable, free of contaminants and long-lived
- Identify / develop potential crops suitable for the space environment
- Understand automation and human factors
- Determine scalability for different concepts and architectures

Filling these gaps will help enable future human exploration and move us toward Earth-independence.